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ABSTRACT

These standards have been developed to provide a rationale and educational model for establishing Technology Education programs and for modifying Industrial Arts programs to reflect characteristics of technological systems. National curriculum theories and practices and Delaware's Educational Goals have provided the foundation for the development of these standards. It is recognized that although Technology Education specialists are needed at each level, all disciplines are connected to technology. Teachers, supervisors, teacher educators, and administrators are encouraged to adapt and apply these curriculum standards in Technology Education curriculum development and implementation activities in grades K-12. The introductory section includes the rationale, the mission statement, philosophy, definition of technology education, descriptions of the three levels of technology education, and curriculum standards policy and use. The curriculum standards for the elementary level cover technological awareness and technological relevance. Middle level includes introduction to technology, inventions and innovations, and technological systems. The high school standards cover bio-related technology systems, communications technology systems, and physical technology systems. (KR)

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TECHNOLOGY EDUCATION

CURRICULUM STANDARDS

K - 12

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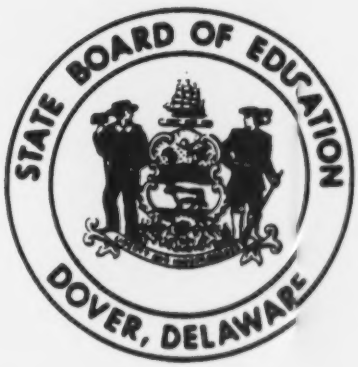

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TECHNOLOGY EDUCATION

CURRICULUM STANDARDS

K - 12

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The Delaware Department of Public Instruction
Vocational Education Division

Revised October, 1990

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Foreword

Technology is rapidly becoming a national school discipline. Each school system throughout Delaware is recognizing the need to prepare youth for a world almost beyond our imagination. This document represents a bold approach to a major need in our society.... **Technology Education.**

We cannot afford to ignore the need for preparation of the children and adults in Delaware for their destiny in the technological world of the present and future. Technology Education Curriculum Standards (K-12) have been developed to provide a rationale and educational model for establishing Technology Education programs and for modifying Industrial Arts programs to reflect characteristics of technological systems. National curriculum theories and practices and Delaware's Educational Goals have provided the foundation for the development of these Technology Education Curriculum Standards. It must be recognized that while Technology Education specialists are needed at each level, all disciplines are connected to technology. Teachers, supervisors, teacher educators and administrators are encouraged to adapt and apply these curriculum standards in Technology Education curriculum development and implementation activities K-12.

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Our appreciation is given to each of the states and provinces who provided their curriculum standards and guides for review. Special thanks is given to the states of Colorado, New Jersey, New York, Ohio, Pennsylvania, and Virginia for their cooperation and openness in sharing their standards and curriculum material to improve the delivery of Technology Education in Delaware.

Steven A. Barbato
State Supervisor - Technology Education
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Department of Public Instruction

Technology Education Rationale

The human race has always been linked to the develo pment and management of technology. Technology has always been a significant force in hum an development, but it has never been as powerful an influence on our culture and life style as it is today.

Society is in the midst of a technological explosion that will continue into the 21st century. This technological explosion will continue to alter our life a nd work styles. Changes in the way we check out of the supermarket with laser scanners, the wa y we communicate instead of commute to work, and the way we consider a product in the light of its environmental impacts are a few examples of our rapidly changing life and work styles.

Technological interactions are going to be used by peop e to solve many of society's physical and social issues. This integration of technology into so m any of society's processes demands that technological literacy be an integral part of the educati onal process. Our quality of life can be preserved and improved with a complete understanding of the interaction between technological and ecological systems. Basic education must stress the understanding between the possibilities and the limitations technology offers people for the soluti on to problems in an environmentally and socially responsible manner.

Technology Educ ation Mission Statem ent

The mission of Technology Education is to insure that all students are prepared to live and work in a technological world with the ability to be technolog ically ***aware***, technologically ***literate***, technologically ***sensitive***, technologically ***capable*** and technologically ***competent***.

Technology Educ ation Philosophy

Because of the exponential rate of change in our techn ological society, Technology Education prepares students to live in a technological world an d to be technologically aware, literate, sensitive, capable and competent. All students should actively participate in broad experiences using technologies which demand exposure to, and ex perience in: communication technology systems, physical technology systems (production and tr ansportation), and bio-related technology systems. Students must understand technological inno vation, the impacts of the products and processes of technology on the quality of life, and the nee d for critical evaluation of societal matters involving consequences of technology. Students must learn how to carry out the application of scientific, mathematical and technological concepts thr ough analytical and critical thinking and experientially-based problem solving.

Technology Education Defined K-12

Technology Education K-12 is the study of the applicati on of organized knowledge and problem-solving techniques to satisfy human wants and needs and to extend human capabilities in physical technology systems, communications technology system s, and bio-related technology systems.

This study provides a way to develop problem solving a nd creative thinking techniques. It draws from inventions, innovations, and creative developments of the past to help students develop skill in designing, inventing, researching, experimenting, pro ducing, and controlling their environment for the future. It looks at the benefits as well as the pr oblems technology has created to better understand its wise use.

Transition from Industrial Arts to Technology Education

Manual Training and Industrial Arts have a long history based on the study of industrial processes. Students have been trained in "arts and crafts" and in the basics of industrial production. They have been shown the processes used to create consumer goods and, to a lesser extent, encouraged to take this information and to create useful devices.

Technology Education builds on this sound tradition by using creative activities to foster problem solving and system relatedness – a holistic approach. Each student is actively involved in classroom/laboratory activities that develop knowledge, skills and attitudes regarding industry and technology. Emphasis is given to nurturing leadership, communication, social interaction, problem-solving and manipulative skills. Personal and social growth is fostered through cooperative learning with other students in the laboratory and through the Technology Student Association (TSA) activities. The technological method of problem solving is experienced in identifying a problem, collecting and analyzing data, generating alternatives, synthesizing a design or plan, developing a proposed product or service, and evaluating the process and results. Throughout this educational process, students are also taught to explore vocational and avocational interests and to make wise consumer, citizen, and career decisions.

The major content areas of Technology Education (communication systems, physical technology systems and bio-related technology systems), while similar to existing content clusters in industrial arts education, feature the following characteristics that are often not a part of traditional industrial arts programs:

- Creative skills in the processes of designing, engineering, inventing, innovating, researching, experimentating, developing and controling are each important components.
- A systems approach is employed (i.e., inputs resources, processes, outputs, monitoring, feedback and control), both in the study of the content areas and in the teaching methodologies.
- Relationships to basic academic subjects – especially mathematics, science, social studies and communications – are stressed, and problem-solving strategies requiring identification of technological problems, data gathering and synthesis, decision making and evaluation are included.
- Industry and technology are approached from a holistic point of view that stresses knowledge, manipulative performance, and values clarification.

The content, laboratory, equipment and material requirements and expenditures for Technology Education are similar to those of industrial arts education. Therefore, new facilities and a major capital investment are not necessary to change or implement a transition. The certified industrial arts teacher can teach Technology Education. The Department of Public Instruction and Delaware Technology Education Association will provide supportive services (i.e., curriculum material, on-going staff development, business and industry support).

An important characteristic required of local school districts is a receptivity of the concepts embodied in Technology Education. Equally important is a commitment on the part of local Technology Education/IA faculty members to upgrade and retrain to facilitate the implementation of Technology Education. This effort can be accomplished through both self-study and appropriate inservice activities.

Technology Education

Elementary Level

[K-3 and 4-6]

Technology Education experiences are designed to be infused into the total elementary school program in order to motivate and reinforce learning and to help students achieve the goals of the total program. These experiences allow students to become more **aware** of technology, develop psychomotor skills, and encourage divergent thinking and conceptualizing. This provides the **relevance** and basis for an understanding of the influence technology has on society.

One solution might be that a resource person be provided at the elementary school level who is certified in Technology Education/IA to best meet the needs of our curriculum. It is strongly suggested that elementary teachers enroll in courses or workshops pertaining to the infusion of Technology Education activities with math, science and social studies principles and theories as it relates to business and industry.

Technology Education

Middle Level
[7-8]

The Technology Education program at the middle level is an integral part of the core curriculum of each student. It is an activity based program that is concerned with understanding the evolution, application, and significance of technology, and the processes of problem solving and creating. The focus of the Technology Education program is to assist the middle level student in exploring and appreciating an environment which cannot be separated from technology, and preparing for appropriate educational and career choices. The Technology Education program in grades 6, 7, & 8 are based on these courses: **Introduction To Technology, Inventions and Innovations**, and **Technological Systems**. The makeup of the middle level should allow course offerings that provide for the sequential program objectives described in these curriculum standards.

Technology Systems Model
High School Level
[9-12]

The High School level Technology Systems approach in Delaware is structured around three technological areas. They are **Communication Technology**, **Physical Technology**, and **Bio-related Technology**. All of these systems (communication, physical, and bio-related) work together continuously to make our society one of the most technologically advanced in the world. These technological areas are defined in the following way:

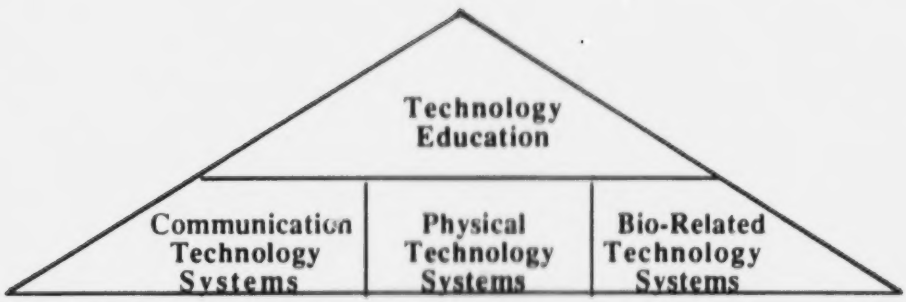
The **Communication Technology System** focuses on the processes and techniques of encoding, transmitting, receiving, storing, retrieving, and decoding graphic and electronic messages. These systems reflect technology that involves the use of devices or methods to collect, process, store, or deliver information using electronic, graphic, photographic and/or mechanical means.

The **Physical Technology System (Production and Transportation)** employs technological practices to construct, produce, and/or transport products, manage goods or services, and control waste. These systems reflect technology that involves the construction or production of products. Physical technology also encompasses the transportation of living and nonliving materials and the production and distribution of energy.

The **Bio-related Technology System** focuses on the practical application of biological organisms to make or modify products. The system includes the production process techniques relating to chemical, agricultural, and medical technology and their resulting products. These include growth and fermentation systems, foods and beverages, fuel and chemicals, materials, health care, agriculture, waste treatment, and regulations to benefit society.

This content base forms the foundation for High School Level Technology Education in Delaware.

Technology Systems Model
High School Level
[9-12]
(cont'd)



Communication Systems	Physical Systems (Production & Transportation)	Bio-related Systems
Graphic Communications	Electricity/Electronics	Waste Management
Photography	Transportation - Power	Fuels & Chemicals
Telecommunications	Construction	Environment Technology
Electronic Communications	Control Systems	Cybernetics
Arch Design	Material & Processes	Pre-Engineering
Drafting & Design	Manufacturing Enterprise	Health Care Systems
Research & Development in in Communications	Pre-Engineering	Ergonomics
Audio-video Communications	Alternate Energy Systems	Research & Development in Bio-related Technology
Pre-Engineering	Aviation & Aero-space	Bio-related Technical Systems
Desktop Publishing	Research & Development in Physical Technology	Other
Other	Material Testing & Processes	
	Structure Design & Evaluation	
	Non-metallic Processes	
	Metallic Processes	
	Production Systems	

Note: This does not comprise an exhaustive list of possible course offerings.

HOW TO USE THE CURRICULUM STANDARDS

These standards are meant to be used by school district administrators and teachers in developing their local Technology Education program. The standards are a resource guide for curriculum development. They are also a statement of the goals and objectives of the State Technology Education program. This guide is not meant to offer day-to-day lesson plans. Rather, it should be used by administrators and teachers as a guide to the selection of strategies and materials to achieve these goals and objectives. Local curriculum development efforts should be directed toward those ends while making adaptations which meet local needs and goals.

The Technology Education curriculum standards for grades K-12 are in the following categories: K-3, 4-6, 7-8 and 9-12. Each set of standards includes:

A. **Program Objectives** - listing on the left side of the page which describes the area of instruction.

B. **Student Expectations** - listing on the right side of the page of what the student will be expected to do in these instructional areas.

CURRICULUM STANDARDS POLICY

The State Board of Education believes that the curriculum in the public schools of Delaware must be systematically reviewed and refined on a periodic basis to ensure that it remains relevant to the needs of students in a rapidly changing society as well as in their respective communities.

In order to guide statewide curriculum development it is the responsibility of the Department of Public Instruction to establish and maintain state Curriculum Standards for all subject areas in grades K-12. Those Standards shall consist of general objectives for the instructional program and student performance expectations. The state Curriculum Standards shall serve as a base for the development of district curriculum. The Department shall establish and publish its multi-year schedule for the revision of specific Standards.

It is the responsibility of each school district to develop curriculum guides for each subject area in grades K-12. By September, 1994 each district shall revise its curriculum guides in accordance with the State Curriculum Standards. Thereafter, the district revisions shall be completed within two years of the adoption of the revised State Curriculum Standards by the State Board of Education. All curriculum guides shall be approved by local school district boards of education on an annual basis.

Technological Awareness
K-3

The program will provide instruction in:	The student will be expected to:
1. Technological awareness as a significant force in everyone's life	1.1 Recognize examples of technology
	1.2 Compare how technology helps and hurts them and their world
	1.3 Create simple solutions to basic needs and wants identified by themselves and their world
	1.4 Display a willingness to risk using new technological tools and materials in order to solve problems within limits that are set by the teacher and students
	1.5 Differentiate the following resources used in technical systems: people, information, materials, tools and machines, energy, capital, and time
	1.6 Recognize standard technological signs and symbols used in society
	1.7 Describe how people determine whether technology is helpful or harmful
	1.8 Demonstrate how to use simple tools safely
	1.9 Recognize and identify tools that people use to satisfy their needs

Technological Awareness
K-3

The program will provide instruction in:	The student will be expected to:
2. Life skill development through problem solving	2.1 Illustrate how people use the computer as a tool to communicate
	2.2 Identify through role playing how adults use technology in their jobs
	2.3 Produce and use communication systems that have input and output processes
	2.4 Recognize and manipulate simple machines
	2.5 Illustrate the use of computers as a general purpose tool of technology
	2.6 Conceptualize fundamental communication devices
3. Classroom/laboratory activities and support services for the Technology Student Association (TSA)	3.1 Explore occupational and career opportunities
	3.2 Develop leadership and citizenship abilities by organizing a technology student association chapter and a program of group activities
	3.3 Describe ways that the Technology Student Association (TSA) helps inform students about technological advances in our society
	3.4 Describe how the Technology Student Association (TSA) provides activities that inform and motivate students to learn more about technological systems
	3.5 Participate in TSA activities which are relevant to the primary Level concepts and practices

Technological Relevance
4-6

The program will provide instruction in:	The student will be expected to:
1. Technology as the application of knowledge to solve human problems and extend capabilities	1.1 Evaluate how technological systems safely convert raw materials into basic industrial materials which are then converted into end products
	1.2 Compare examples of the growth of technology from the beginning of the human race and up to today's rapid development
	1.3 Demonstrate that cooperation is essential in successful problem solving in group situations
	1.4 Articulate ways that lives are greatly enriched in comparison with times past as a result of evolving technology
	1.5 Analyze ways in which technological developments have caused changes in our culture and society
2. Critical thinking, problem solving, and communication skills	2.1 Define the problem solving model
	2.2 Apply the problem solving model
	2.3 Use a systems model to explain a technological development
	2.4 Illustrate ways that technology will affect the future of our society and how we can prepare for that rapid change
	2.5 Use the problem solving model to trace the origin of a selected technological innovation

Technological Relevance
4-6

The program will provide instruction in:	The student will be expected to:
3. Societal impacts and consequences of technology on the individual and society	3.1 Compare some of the advantages and disadvantages that a local factory could have on a community
	3.2 Evaluate the advantages and disadvantages of automation
	3.3 Compare and contrast how technology provides both positive and negative effects on the quality of life
4. Lifelong learning through technological processes	4.1 Use the system model to illustrate how materials, information, and energy are processed in systems
	4.2 Evaluate how technology is constantly evolving to meet human needs
	4.3 Evaluate how changes in technology have affected occupations (via personal interviews)
5. Classroom/laboratory activities and support services for the Technology Student Association (TSA)	5.1 Explore occupational and career opportunities
	5.2 Develop leadership and citizenship abilities while participating in TSA activities relevant to the primary and middle levels
	5.3 Describe how the Technology Student Association (TSA) provides activities that inform and motivate students to learn more about technological systems

TECHNOLOGY EDUCATION CURRICULUM STANDARDS

Middle Level Standards

Course offerings for specific grade levels are only suggested. Individual districts may offer these courses at levels which best suit their needs throughout the middle level. This may include various grade levels (6-9), depending upon local conditions.

Introduction to Technology - (Early Middle Level Experience)

The program will provide instruction in:	**The student will be expected to:**
1. Technology as the application of knowledge to solve human problems and extend capabilities in a safe manner	1.1 Evaluate ways that everyone's life is greatly enriched in comparison with times past as a result of evolving technology
	1.2 Analyze ways in which technological developments have caused changes in our culture and society
2. Critical thinking, problem solving and communication skills	2.1 Describe and identify the problem solving model
	2.2 Trace the origin of a selected technological innovation using the problem solving model
	2.3 Conceptualize ways that technology will affect the future of our society, and how we can prepare for this change
3. Math and science principles used in the solution of problems	3.1 Identify and apply math & Science principles to solve technological problems
	3.2 Make use of simple machines to demonstrate basic scientific principles
	3.3 Utilize testing equipment in order to solve specific problems
	3.4 Identify the basic machines that are incorporated into a device
	3.5 Use selected instruments to develop their own design ideas

Introduction to Technology (Middle Level)

The program will provide instruction in:	The student will be expected to:
4. Environmental impacts and consequences of technology on the individual and society	4.1 Describe how technology provides both positive and negative effects on the quality of life
	4.2 Identify environmental problems
	4.3 Develop solutions to selected environmental problems
5. Lifelong technological processes	5.1 Evaluate how technology is constantly evolving to meet human needs
	5.2 Evaluate how changes in technology have affected occupations (via personal interviews)
	5.3 Use the problem solving model to describe learning as a lifelong process
6. Classroom/laboratory activities and support services for the Technology Student Association (TSA)	6.1 Explore occupational and career opportunities
	6.2 Develop leadership and citizenship abilities by organizing a technology student association chapter and a program of group activities
	6.3 Describe ways that the Technology Student Association (TSA) helps inform students about technological advances in our society
	6.4 Describe how the Technology Student Association (TSA) provides activities that inform and motivate students to learn more about technological systems
	6.5 Participate in TSA activities which are relevant to the Middle level concepts and practices

Inventions & Innovations - (Middle Level)

The program will provide instruction in:	The student will be expected to:
1. Critical thinking, problem solving, and communication skills	1.1 Describe and identify the problem solving model
	1.2 Complete a technological problem solving cycle
	1.3 Evaluate each step of the design/problem solving process
2. First-hand experiences with technology	2.1 Know the different materials used in technological processes and examine their properties
	2.2 Recognize the relationship between machines, tools, and human capabilities
3. Math and science principles in the solution of problems	3.1 Identify and apply the math and science principles to solve technological problems
	3.2 Identify the basic machines that are incorporated into a device
4. Environmental impacts and consequences of technology on the individual and society	4.1 Evaluate ways in which technological developments in specific areas have caused changes in culture and society
	4.2 Work in groups to research the impacts on our civilization, given an example of technology
5. Lifelong learning through technological processes	5.1 Judge five possible consequences of not keeping abreast of technology
	5.2 Evaluate how changes in technology have affected occupations (i.e. via personal interviews)
	5.3 Use the problem solving model to describe learning as a lifelong process

The program will provide instruction in:	The student will be expected to:
6. Classroom/laboratory activities and support services for the Technology Student Association (TSA)	6.1 Explore occupational and career opportunities
	6.2 Develop leadership and citizenship abilities by organizing a technology student association chapter and a program of group activities
	6.3 Describe ways that the Technology Student Association (TSA) helps inform students about technological advances in our society
	6.4 Describe how the Technology Student Association (TSA) provides activities that inform and motivate students to learn more about technological systems
	6.5 Participate in TSA activities which are relevant to the Middle level concepts and practices

Technological Systems
(Grades 7-8 or early High School)

The program will provide instruction in:	The student will be expected to:
1. Critical thinking, problem solving, and communication skills	1.1 Plan various solutions to design problems
	1.2 Develop, test and modify their own design ideas through experimentation and analysis
2. First hand experiences with technology	2.1 Evaluate past, present, and emerging technologies through field trips, guest speakers, and/or video presentations, etc.
	2.2 Use a computer system to solve a problem
	2.3 Research and develop solutions to various technological problems
3. Math and science principles through the solution of problems	3.1 Measure or calculate various properties of energy, materials, etc.
	3.2 Utilize various measuring implements
	3.3 Solve a problem using a given formula
4. Impacts and consequences of technology on the individual and society	4.1 Evaluate environmental problems and discuss the causes and consequences related to society
	4.2 Differentiate between positive and negative technological impacts on the individual and society

Technological Systems
(Grades 7-8 or Early High School)

The program will provide instruction in:	The student will be expected to:
5. Basic skills and their practical applications	5.1 Utilize and apply related math, science, language arts and social study skills to solve specific technological problems
	5.2 Use selected instruments to develop their own design ideas
6. Lifelong learning through technological processes	6.1 Recommend reasons for keeping abreast of technology and its varied applications
	6.2 Develop an illustrated presentation of a technological 'change' that has occurred in their lifetime
	6.3 Use the problem solving model to describe learning as a lifelong process
7. Classroom/laboratory activities and support services for the Technology Student Association (TSA)	7.1 Explore occupational and career opportunities
	7.2 Develop leadership and citizenship abilities by organizing a technology student association chapter and a program of group activities
	7.3 Describe ways that the Technology Student Association (TSA) helps inform students about technological advances in our society
	7.4 Describe how the Technology Student Association (TSA) provides activities that inform and motivate students to learn more about technological systems
	7.5 Participate in TSA activities which are relevant to the Middle level concepts and practices

Technology Education

State Curriculum Standards

Level: High School Grades: 9-12
Area: Bio-related Technology Systems

The program will provide instruction in:	**The students will be expected to:**
1. The conceptualization of bio-related technologies	1.1 Investigate current technologies and identify those that are bio-related
	1.2 Differentiate between bio-related and other technologies
	1.3 Describe bio-related issues that impact society as a whole
2. Technological issues facing society in bio-related technology	2.1 Survey and evaluate a product or service of a bio-related based company and report back to the class
	2.2 Investigate and report on the garbage disposal crisis, hazardous waste disposal, etc.
3. Critical thinking, problem solving, and communication skills in bio-related technology	3.1 Plan an alternative solution using the design cycle, given selected bio-related problems
	3.2 Design, build, test, and evaluate bio-related solutions to selected design problems
4. Math and science principles through the solution of problems related to bio-technology	4.1 Measure and calculate various properties of energy used in bio-related technologies
	4.2 Utilize various measuring implements successfully
	4.3 Evaluate the outcome of selected problems using the necessary mathematic and scientific principles and formulas

Bio-related Technology Systems (9-12)

The program will provide instruction in:	The students will be expected to:
4. The impacts and consequences of bio-related technology on the individual and society	4.1 Identify a current environmental problem, and recommend what technologies are available to solve the problem as related to bio-technology
	4.2 Explain how bio-related technologies have affected society in the past, present, and future
	4.3 Identify the technological causes and possible solutions to selected bio-related problems
	4.4 Conceptualize the pros and cons of a selected bio-related area
	4.5 Survey and simulate how computer technology has changed traditional methods of design and productivity
5. Basic skills in their practical and safe applications related to bio-technology	5.1 Identify and use tools and test equipment that are necessary for specific applications
	5.2 Demonstrate safe skills in the use of tools and test equipment
	5.3 Test, analyze and apply appropriate bio-related technology problems using related math, science, language arts and social studies skills

Bio-related Technology Systems (9-12)

The program will provide instruction in:	**The student will be expected to:**
6. Lifelong learning through technological processes	6.1 Conclude how technological advancement creates the need for continued training programs in various careers
	6.2 Identify and analyze career areas that have been reduced or lost due to a lack of continued education or rapidly changing technological field
	6.3 Conceptualize the relationship between schooling and work
	6.4 Conclude why people find it difficult to accept technological change
7. Career decisions in bio-related technology	7.1 Research and describe a specific career in bio-related technology
	7.2 Determine how technological change has affected bio-related technology careers in the past and could affect them in the future
	7.3 Gain first-hand knowledge of selected technological fields from various guest speakers and field trips to bio-related technology industries
	7.4 Identify skills needed to acquire/attain employment in bio-related technology areas
8. Educational opportunities in bio-technology	8.1 Research post secondary education institutions to determine course offerings in bio-related technologies
	8.2 Identify various vocational/technical programs and student organizations (ex: Technology Student Association, Technology Education Collegiate Association, etc.)

Bio-related Technology Systems (9-12)

The program will provide instruction in:	The student will be expected to:
9. Problem solving skills in the solution of community, industry, and other "real life" problems related to bio-technology	9.1 Apply problem solving skills used in the solutions of prevocational and interdisciplinary challenges
	9.2 Recommend an alternative solution using the design cycle, given selected community or industrial problems
10. The technological problem solving process and application of the process to satisfy a want or need	10.1 Evaluate the impact of major inventors and their inventions in bio-related technologies on society
	10.2 Compose and analyze the process used in the development of an invention or innovation in bio-related technologies
	10.3 Develop a useful vocabulary of related items to bio-related technologies
	10.4 Recognize the role played by inventors/inventions on a global basis in advancing bio-related technology
	10.5 Identify and report on the technological problems arising from human wants or needs
	10.6 Apply creative problem solving methods to generate solutions to bio-related technological problems
	10.7 Invent a desired output and plan a course of action and identify needed resources

Bio-related Technology Systems (9-12)

The program will provide instruction in:	The students will be expected to:
	10.8 Demonstrate the ability to communicate design ideas in bio-related technologies
	10.9 Produce and compose a record of all student work done during the development of an invention
	10.10 Modify an existing design solution as an alternative to developing a new solution
	10.11 Evaluate the steps necessary to patent an invention in bio-related technologies
11. Classroom/laboratory activities and support services for the Technology Student Association (TSA)	11.1 Explore occupational and career opportunities
	11.2 Develop leadership and citizenship abilities by organizing a technology student association chapter and a program of group activities
	11.3 Describe ways that the Technology Student Association (TSA) helps inform students about technological advances in our society
	11.4 Describe how the Technology Student Association (TSA) provides activities that inform and motivate students to learn more about technological systems
	11.5 Participate in TSA activities which are relevant to the High School level concepts and practices

Technology Education
State Curriculum Standards

Level: High School Grades: 9-12
Area: Communications Technology System

The program will provide instruction in:	**The students will be expected to:**
1. Technological issues facing society in communications technology	1.1 Survey and evaluate a product or service of a communications based company and report back to the class
	1.2 Investigate and report on communication systems used in business and industry
2. Critical thinking, problem solving, and communication skills	2.1 Plan an alternative solution using the design cycle, given selected communication problems
	2.2 Design, build, test, and evaluate communication solutions to selected design problems
3. Math and science principles in the solution of communications technology problems	3.1 Measure and calculate various properties of energy used in modern communications
	3.2 Utilize various measuring implements successfully
	3.3 Evaluate the outcome of selected problems applying the necessary mathematic and scientific principles and formulas
4. Impacts and consequences of communications technology on the individual and society	4.1 Identify a current communication problem, and recommend what technologies are available to solve the problem as related to communication technology
	4.2 Demonstrate how communications technologies have affected society in the past, present, and future
	4.3 Evaluate the technological causes and possible solutions to selected communication problems

The program will provide instruction in:	The student will be expected to:
	4.4 Conceptualize the pros and cons of the field, given a selected communication area
	4.5 Survey and produce how computer technology has changed traditional methods of design and productivity
5. Basic skills and their practical and safe applications in communications technology systems	5.1 Identify tools and test equipment that are used for specific applications
	5.2 Develop skills in the use of various tools and test equipment
	5.3 Test, utilize and analyze appropriate communication skills to solve various technological problems
6. Lifelong learning through technological processes	6.1 Conclude how technological advancement creates the need for continued training programs in various careers
	6.2 Research selected career areas that have been reduced or lost due to a lack of continued education or rapidly changing technological fields
	6.3 Conceptualize the relationship between schooling and work
	6.4 Conclude why people find it difficult to accept technological change

Communications Technology Systems (9-12)

The program will provide instruction in:	The student will be expected to:
7. Career decisions in communications technology	7.1 Research and describe a specific career in communications technology
	7.2. Determine how technological change has affected communications technology careers in the past and could affect them in the future
	7.3 Gain first-hand knowledge of selected technological fields from various guest speakers and field trips to communication technology industries
	7.4 Identify skills needed to acquire/attain employment in communications areas
8. Education opportunities in communications technology	8.1 Research post secondary education to determine course offering in communications technologies
	8.2 Identify various vocational/technical programs and student organizations. (ex: Technology Student Association, Technology Education Collegiate Assoc., etc.)
9. Problem solving skills in the solution of community, industry, and other "real life" problems in communications technology	9.1 Apply problem solving skills used in the solution of prevocational and interdisciplinary challenges
	9.2 Recommend an alternative solution using the design cycle given selected community or industrial problems

Communications Technology Systems (9-12)

The program will provide instruction in:	The student will be expected to:
10. The technological problem solving process to satisfy identified wants or needs	10.1 Evaluate major inventors, their inventions, and impacts on society of communications technologies
	10.2 Compose and analyze the process used in the development of an invention or innovation in communications technologies
	10.3 Develop a useful vocabulary of related items to communications technologies
	10.4 Recognize the role played by inventors/inventions on a global basis in advancing communications technology
	10.5 Research and experience technological problems arising from human wants or needs
	10.6 Apply creative problem solving methods to generate solutions to communications technology problems
	10.7 Identify a desired output and plan a course of action and identify needed resources to create possible solutions
	10.8 Demonstrate the ability to communicate design ideas in communications technologies
	10.9 Compose a record of all student work done during the development of an invention or innovation
	10.10 Modify an existing design solution as an alternative to developing a new solution
	10.11 Evaluate the steps necessary to patent an invention in communications technologies

Communications Technology Systems (9-12)

The program will provide instruction in:	The student will be expected to:
11. Classroom/laboratory activities and support services for the Technology Student Association (TSA)	11.1 Explore occupational and career opportunities
	11.2 Develop leadership and citizenship abilities by organizing a technology student association chapter and a program of group activities
	11.3 Describe ways that the Technology Student Association (TSA) helps inform students about technological advances in our society
	11.4 Describe how the Technology Student Association (TSA) provides activities that inform and motivate students to learn more about technological systems
	11.5 Participate in TSA activities which are relevant to the High School level concepts and practices

Technology Education

State Curriculum Standards

Level: High School Grades: 9-12
Area: Physical Technology Systems (Production and Transportation)

The program will provide instruction in:	The students will be expected to:
1. Technological issues facing society in physical technology	1.1 Survey and evaluate a product or service of a production/ transportation based company and report back to the class
	1.2 Investigate and report on physical technology systems used in business and industry
2. Critical thinking, problem solving, and communication skills in physical technology	2.1 Plan an alternative solution using the design cycle, given selected physical problems
	2.2 Design, build, test, and evaluate physical solutions to selected design problems
3. Math and science principles in the solution of physical technology problems	3.1 Measure and calculate various properties of energy
	3.2 Utilize various measuring implements successfully
	3.3 Evaluate the outcome of selected problems using the necessary mathematic and scientific principles and formulas
4. Impacts and consequences of physical technology on the individual and society	4.1 Identify current production and transportation problems and recommend what technologies are available to solve the problem as related to physical technology
	4.2 Demonstrate how physical technologies have affected society in the past, present, and future
	4.3 Evaluate the technological causes and possible solutions to selected production and transportation problems

Physical Technology Systems (9-12)

The program will provide instruction in:	The student will be expected to:
	4.4 Conceptualize the pros and cons of a selected physical area
	4.5 Survey and produce how computer technology has changed traditional methods of design and productivity
5. Basic skills and their practical and safe applications in physical technology	5.1 Identify tools and test equipment that are used for specific applications
	5.2 Develop skills in the use of various tools and test equipment
	5.3 Test, analyze and apply appropriate physical technology problems using related math, science, language arts and social studies skills
6. Lifelong learning through technological processes	6.1 Conclude how technological advancement creates the need for continued training programs in various careers
	6.2 Research career areas that have been reduced or lost due to a lack of continued education or rapidly changing technological fields
	6.3 Conceptualize the relationship between schooling and work
	6.4 Conclude why people find it difficult to accept technological change

Physical Technology Systems (9-12)

The program will provide instruction in:	The student will be expected to:
7. Career decisions in physical technology systems	7.1 Research and describe a specific career in physical technology
	7.2 Determine how technological change has affected physical technology careers in the past and could affect them in the future
	7.3 Gain first-hand knowledge of selected technological fields from various guest speakers and field trips to physical technology industries
	7.4 Identify skills needed to acquire/attain employment in physical technology areas
8. Further education in physical technology areas	8.1 Research postsecondary education to determine course offerings in physical technologies
	8.2 Identify various vocational/technical programs and student organizations. (ex: Technology Student Association, Technology Education Collegiate Assoc., etc.)
9. Problem solving skills in the solution of community, industry, and other "real life" problems in physical technology	9.1 Apply problem solving skills used in the solution of prevocational and interdisciplinary challenges
	9.2 Recommend an alternative solution using the design cycle, given selected community or industrial problems

Physical Technology Systems (9-12)

The program will provide instruction in:	The student will be expected to:
10. The design, construction, and application of control technology	10.1 Demonstrate the ability to operate a robotic/mechanical device
	10.2 Evaluate the operating characteristics of electric, hydraulic, pneumatic and mechanical power systems
	10.3 Describe selected data acquisition (sensor) systems
11. The technological problem solving process to satisfy human wants or needs	11.1 Evaluate the impact of a major inventor and his/her invention in the physical technologies
	11.2 Compose and analyze the process used in the development of an invention or innovation in the physical technologies
	11.3 Develop a useful vocabulary of related items to the physical technologies
	11.4 Recognize the role played by inventors/inventions on a global basis in advancing physical technology
	11.5 Research and report on technological problems arising from human wants or needs
	11.6 Apply creative problem solving methods to generate solutions to physical technological problems
	11.7 Identify a desired output and plan a course of action and identify needed resources

Physical Technology Systems (9-12)

The program will provide instruction in:	The student will be expected to:
	11.8 Demonstrate the ability to communicate design ideas in the physical technologies
	11.9 Produce and compose a record of all student work done during the development of an invention
	11.10 Modify an existing design solution as an alternative to developing a new solution
	11.11 Evaluate the steps necessary to patent an invention in the physical technologies
12. Classroom/laboratory activities and support services for the Technology Student Association (TSA)	12.1 Explore occupational and career opportunities
	12.2 Describe ways that the Technology Student Association (TSA) helps inform students about technological advances in our society
	12.3 Describe how the Technology Student Association (TSA) provides activities that inform and motivate students to learn more about technological systems
	12.4 Develop leadership and citizenship abilities by organizing a technology student association chapter and a program of group activities
	12.5 Participate in TSA activities which are relevant to the High School level concepts and practices